SUPPOSE THE OFFSPRING DISTRIBUTION IS A GEOMETRIC DISTRIBUTION WITH PARAMETER p

p: PROB. OF "SUCCESS"

X: THE NUMBER OF TRIALS TO OBTAIN 1 SUCCESS.

$$a = \left(p, p(1-p), p(1-p)^2, p(1-p)^3, \dots\right)$$

PROB. OF EXTINCTION?

$$G(s) = E(s^X) = \sum_{k=0}^{\infty} s^k p(1-p)^k$$

$$= p \sum_{k=0}^{\infty} \left(s(1-p)\right)^k = p \frac{1}{1-s(1-p)}$$

$$s = \frac{p}{1-s(1-p)} \iff s - s^2(1-p) = p$$

$$s^2(1-p) - s + p = 0$$

$$\frac{(s-1)\left(s(1-p)-p\right)}{s(1-p)-p = 0} = 0 \iff$$

$$\boxed{s = \frac{p}{1-p}}$$